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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/720,122	11/25/2003	Toshio Tsujimoto	245926US0XDIV	4386

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EXAMINER	
SONG, MATTHEW J	

ART UNIT	PAPER NUMBER
1792	

NOTIFICATION DATE	DELIVERY MODE
03/26/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/720,122	TSUJIMOTO ET AL.	
	Examiner	Art Unit	
	MATTHEW J. SONG	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 January 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *14-16,18,19,21,22,24 and 26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *14-16,18,19,21,22,24 and 26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 1/12/2009 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 14-16, 18-19, 21-22, 24 and 26 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 14 recites, "a thickness of the transparent coated layer is in the range from 0.0051 to 0.449 μm". There is no support for this limitation in the original disclosure because the original disclosure fails to teach any range of thickness for the transparent coated layer. The original disclosure, in Table 2, merely teaches an adhesion amount of the metal oxide in $\mu g/cm^2$. It is noted that the declaration filed on 3/17/2008 fails to cure the

deficiency for the reasons discussed below. The remaining claims depend from claim 14; therefore the same arguments apply.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 14-16, 18-19, 21-22, 24 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hansen et al (US 5,980,629) in view of Watanabe et al (US 6,106,610).

In a method of forming a crucible for production of silicon single crystals, note entire reference, Hansen et al teaches a crucible has inner and outer coatings of a devitrification promoter (col 3, ln 1-50 and col 4, ln 40-55). Hansen et al also teaches granular polycrystalline silicon is loaded into the crucible (col 3, ln 50-67) and the devitrification promoter is preferably

barium, magnesium, strontium or beryllium (col 6, ln 20-5). Hansen et al also teaches devitrification promoters includes metal oxides, carbonates, oxalates and ion pairs of a metal cation and organic anions (col 6, ln 1-65), this clearly suggests applicant's metal salts, metal organic acid salt, and barium carbonate.

Hansen et al does not teach the crystallization promoter is dispersed in a silica matrix. Hansen et al is not particular about the method used to coat the surface of the crucible.

In a method of forming a crucible, note entire reference, Watanabe et al teaches a crystallization promoter can be sued either alone or as a mixture with a powder of synthetic silicon dioxide to form a translucent quartz glass layer. Watanabe et al teaches depositing a synthetic silicon dioxide powder sufficiently impregnated with the aqueous solution, and the layer is formed as a coated film or a solid solution layer on the surface (col 3, ln 30-65 and col 4, ln 1-35), this reads on applicant's crystallization promoter dispersed in a silica matrix. Watanabe et al also teaches a crystallization promoter layer is fused to a base body (col 5, ln 5-30). Watanabe et al also teaches a transparent internal quartz layer (col 5, ln 55-67).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Hansen et al by fusing the layer with a crystallization promoter dispersed in a silica matrix to the base body as taught by Watanabe et al to improve adherence and improve safety be reducing the risk of inhalation and ingestion of the promoter ('629 col 8, ln 10-35).

As to the thickness of the transparent coated layer is in the range from 0.0051 to 0.449 μm, the combination of Hansen et al and Watanabe et al teaches the thickness of the crystallization promoter layer is very small, i.e. smaller than 0.3 mm ('610 col 3, ln 1-67), thus teaches an overlapping range, and overlapping ranges are prima facie obvious (MPEP 2144.05).

Referring to claim 14, the combination of Hansen et al and Watanabe et al teaches a concentration of $1x10^{-5}$ to $1x10^{-8}$ M/cm^2 ('610 claims 3 and 11). Overlapping ranges are prima facie obvious (MPEP 2144.05).

As to the "consisting essentially of" language of claim 14, for the purposes of searching for and applying prior art under 35 U.S.C. 102 and 103, absent a clear indication in the specification or claims of what the basic and novel characteristics actually are, "consisting essentially of" will be construed as equivalent to "comprising." (MPEP 2111.03 [R-3]). The claims and specification lack a clear indication of what the basic and novel characteristics are; therefore the claims is construed as equivalent to "comprising." Furthermore, the combination of Hansen et al and Watanabe et al teaches a silicon dioxide powder impregnated with a crystallization promoter and is silent to other elements, thus meets the claimed language ('610 col 3, ln 30-40).

As to the mechanical strength limitation and the coated layer not being scratched and not changing upon acid washing, the combination of Hansen et al and Watanabe et al teaches a similar method of forming a coated layer by dispersing a crystallization promoter within a silica matrix, as applicant; therefore the properties are expected to be the same because a similar method is expected to produce a product with similar properties. Furthermore, the combination of Hansen et al and Watanabe et al teaches the promoter is fused to the base body ('610 col 5, ln 5-30), which clearly suggests that the promoter is strongly adhered to the base body.

As to a crystallization promoter uniformly dispersed, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of

Hansen et al and Watanabe et al by dispersing the promoter uniformly because having uniform properties would have been desirable.

Referring to claim 15, the combination of Hansen et al and Watanabe et al does not disclose the claimed method of obtaining the crucible using a partial hydrolyzate of alkoxysilane oligomer, which is a product-by-process claim and the patentability determination of a product-by-process claim is based on the patentability of the product and does not depend on its method of production (MPEP 2113). The combination of Hansen et al and Watanabe et al teaches a crucible, which meets all of the claimed product limitations of claim 15. The same arguments apply for claims 16 and 18-20, which specify the liquid used to obtain the crystallization promoter layer.

Referring to claims 21-24 and 26, the combination of Hansen et al and Watanabe et al teaches a crystallization promoter layer **24, 26** on the inside and outside surfaces of the crucible and polysilicon in the crucible. ('629 Fig 1 and col 12, ln 25-35).

Response to Arguments

6. Applicant's arguments with respect to claims 14-16, 18-19, 21-22, 24 and 26 have been considered but are moot in view of the new ground(s) of rejection.

7. Applicant's arguments filed 1/12/2009 have been fully considered but they are not persuasive.

Applicant's argument that support for the claimed thicknesses are found in the Modified Table 2 submitted with the declaration in the Amendment filed March 17, 2008 is noted but not

found persuasive. First, the declaration alleges the claimed thicknesses are determined from calculations rather than actual measurements. No actual measurements of the thickness of the transparent layers of the crucible in the original disclosure we conducted to determine the actual thicknesses. Second, because no thicknesses were measured, the thicknesses disclosed in the declaration are mere estimations based on calculations derived from the amount of adhered metal oxide. Third, the estimations in the declaration are based on assumptions which are incorrect. The declaration determines the amount of mixed oxide based on the measured adhesion amount of the metal oxide and the ratio of the metal oxide and SiO_2 initially supplied (pg 2, lines 1-2). The calculation of the amount of mixed oxide is based on the assumption that the ratio of the metal oxide and the SiO_2 is maintained in the transparent layer, however there is no basis for this assumption to hold true. Thus no calculation of the thicknesses of the transparent layer can be determined based solely on the adhesion amount of the metal oxide without a measurement of the adhesion amount of the SiO_2. Fourth, applicant alleges thicknesses of the transparent layer of 0.0051 to 0.449 μm, however applicant also teaches barium carbonate powder having an average particle size of 1 μm was used to prepare the transparent layer (pg 11, lines 1-5 of the specification), which is several orders of magnitude larger than the claimed thickness.

Applicant's argument that Watanabe and Hansen cannot be combined is noted but not found persuasive. Hansen teaches a crucible surface can be coated by any method that deposits a devitrification promoter to the surface (col 7, ln 35-45); therefore Hansen is not limited to any particular method of forming a promoter layer. Watanabe et al teaches a method of forming a promoter layer by dispersing a promoter in a silicon oxide powder such that the promoter can be fused to the base body (col 3, ln 25-40; col 4, ln 15-30 and col 5, ln 5-30). Watanabe et al is not

relied upon as a teaching to improve the inner surface of a crucible. Watanabe et al is merely relied upon to teach an known method of forming a promoter layer. Watanabe et al's method of forming the promoter layer does not require forming the additional silicon layer. Watanabe et al additional improvement of providing an additional layer does not teach away from the method of forming a crystallization promoter layer with a silica matrix.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW J. SONG whose telephone number is (571)272-1468. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Kornakov can be reached on 571-272-1303. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Matthew J Song

Examiner
Art Unit 1792

MJS
March 15, 2009

/Robert M Kunemund/
Primary Examiner, Art Unit 1792